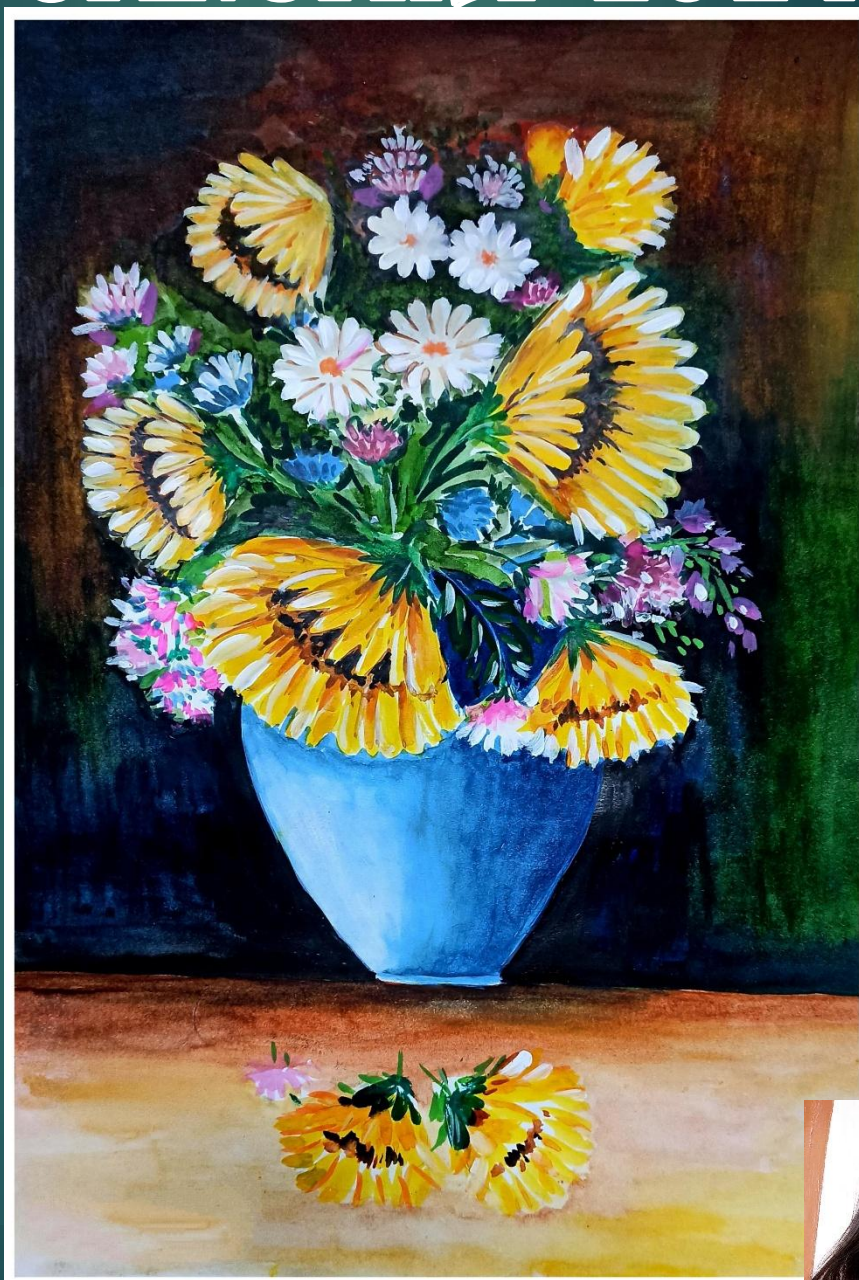


Phyletter

Durgapur Government College
Department of Physics
JANUARY 2024



Art by Riya Biswas
B.Sc (Physics Honours),
Passed out (2020-2023 Batch)





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Message from HOD

Department of Physics focuses on Research oriented Undergraduate Education in fundamental and applied areas of Physics. The mission of the Department is to contribute to the advancement of the understanding of our Universe through basic and applied teaching and make the students engage in the excitement of the world of physics, what they see or what is beyond their vision. Beside undergraduate courses, considerable attention is given to research as well. The Ph.D. Program also runs here under the University of Burdwan. The faculty members of the department are dedicated to provide top-notch instructions in the most effective manner. They contribute to the world of research by publishing research papers in prestigious academic journals and deliver lectures as invitee in different academic Institutions.



Dr Anisur Rahaman



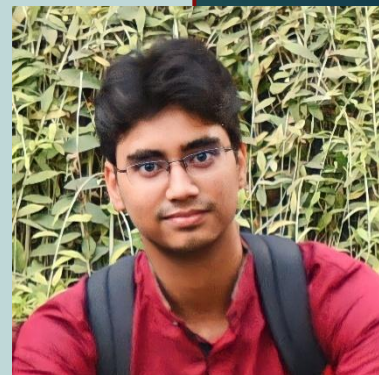
*Student's Write
Up Section*

The Rhythm of Light *And Darkness*

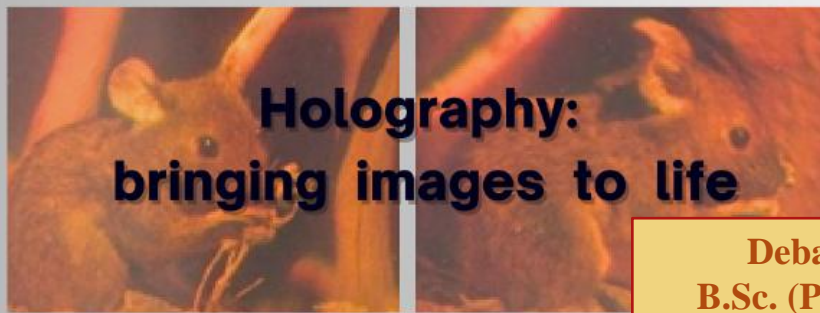
*The Light and the Sky
Will always be up high,
With the Sun glowing white
And the Moon reflecting bright.
The Stars, millions of miles away
Forming the great Milkyway,
Will always give us light with Serenity
Until being destroyed by the Gravity.*

*Then comes the Darkness,
Dwelling in the Universe,
Along with the light,
The Cosmos being completely diverse.
Mysterious yet with most abundance
The Dark matter controls the balance
And the ever flowing Dark energy
Always negates the power of Gravity.*

*So much mystery is still hidden,
So much is still to be found,
The secret of Light and Darkness
Is still everywhere, lurking around.
The Universe is full of magic,
Most of which still has no trace,
Hiding between the depths
Of this ocean of time and space.*



Arijit Raha Roy
B.Sc. (Physics
Honours),
3rd Semester



Holography: bringing images to life



Debangana Dutta
B.Sc. (Physics Honours)
Passed out (2020-2023 batch)

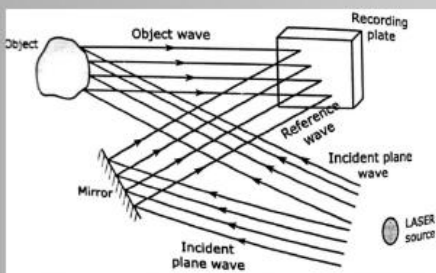
Introduction

Whenever we think of a physical copy of an image, we relate it to a conventional photograph. But the images formed on a photographic plate through an optical lens is 2 dimensional. A complete recording of an image's intensity along with the phase of the wavefront is what gives this 3D imaging technique its name: **holography** (Greek: *holos*; "whole", *graphie*; "writing"). A hologram is a recording of an interference pattern which can reproduce a 3D light field using diffraction.

The phenomenon of holography is a *two-step process*. Recording of the hologram and reconstruction of the hologram to produce the image of the original object, both in intensity and phase. To carry out the experiment one requires a laser beam (for highly directional coherent light), a beam splitter, mirror, holographic plate and an object.

Recording of the hologram

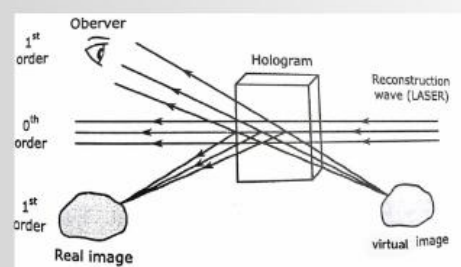
The coherent laser beam is split into two waves; the **object beam** that falls on the photographic plate after being scattered from the object, and the **reference beam** that reaches the film directly without passing the scene. The object beam interferes with the reference beam and the superposition of these two beams produces an **interference** pattern (in the form of dark and bright fringes) and this pattern is recorded on the photographic plate.



1.

Reconstruction of the image

The hologram acts as a **diffraction** grating when a laser beam identical to the reference beam, called the **reconstruction beam** falls on it and produces a real as well as virtual images. One of the diffracted beams emerging from the hologram appears to diverge from an apparent object when projected backward. This virtual image is at the original site of the object and exhibit true 3D characteristics. The real image formed can be recorded on a photographic plate.



2.

Photograph vs Holograph

A regular photograph captures the intensity and colour of light on a light-sensitive film and results in a 2D representation of the object. A hologram on the other hand captures along with the intensity and colour, the phase information and the reconstruction therefore has the appearance of depth and even parallax depending on the angle of view.

Each point on a photograph corresponds to a conjugate point of the object and the intensity and colours are replicated by an according proportionality of pixel density. But each point on a hologram receives information from different parts of the whole object. So, if a photograph is torn in half, it only shows the image imprinted on the remaining half, while even if a hologram is partly destroyed, each fragment can still reproduce information of the whole scene as at the time of recording.

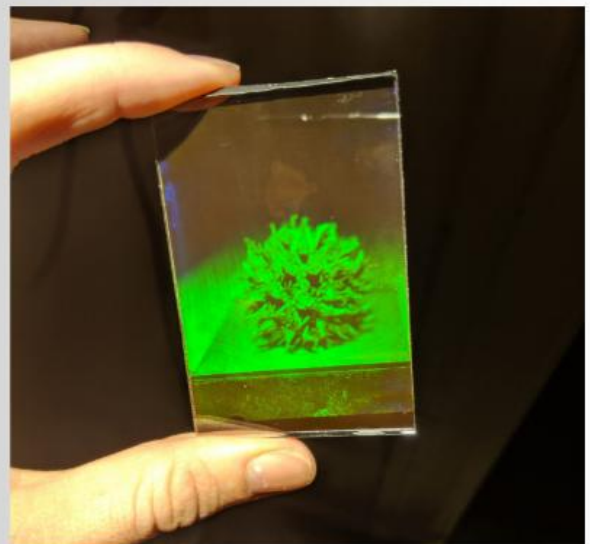
Photographs store only a single image while multiple images can be recorded on the same physical medium, by the method of multiplexing.

Applications

- **Medicine:** it is used to create 3D images of internal organs and tissues, aiding in diagnosis and treatment planning.
- **Astronomy:** *Interferometry* is a technique that involves combining light from two or more telescopes to create a high-resolution images of astronomical objects. Holography can be used to improve the accuracy and precision of interferometric measurements. It is also used in the creation of holographic gratings, ideal for use in *spectroscopy*.
- **Security:** holograms are used as security features on credit cards, passports, and other important documents to prevent counterfeiting.
- **Archaeology:** this method is used to create 3D models of archaeological structures and artifacts, enhancing the understanding and preservation of cultural heritage.
- **Data storage:** allows for high capacity data storage. While optical/magnetic data storage allows bit by bit data storage on the surface of the recording medium, holographic storage enables recoding huge data in parallel throughout the volume of the medium.



3.

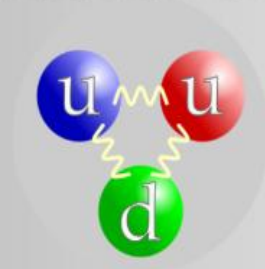


4.

Content source: I. Fundamentals of Optics by Jenkins and White: section 31.1, 31.2. II. Article by Winner Science. III. Wikipedia article.

Image references: I. title background image: Wikipedia> holography. II. (1),(2) Winner Science article : lasers>recording and reconstruction process in holograms. III. (3) Martina Mrongovius 'The Hover' (2004). IV. (4) Martina Mrongovius 'The Conqueror' (2019)

Interaction of 'colour'



Debangana Dutta
B.Sc. (Physics Honours) ,
Passed out (2020-2023 batch)

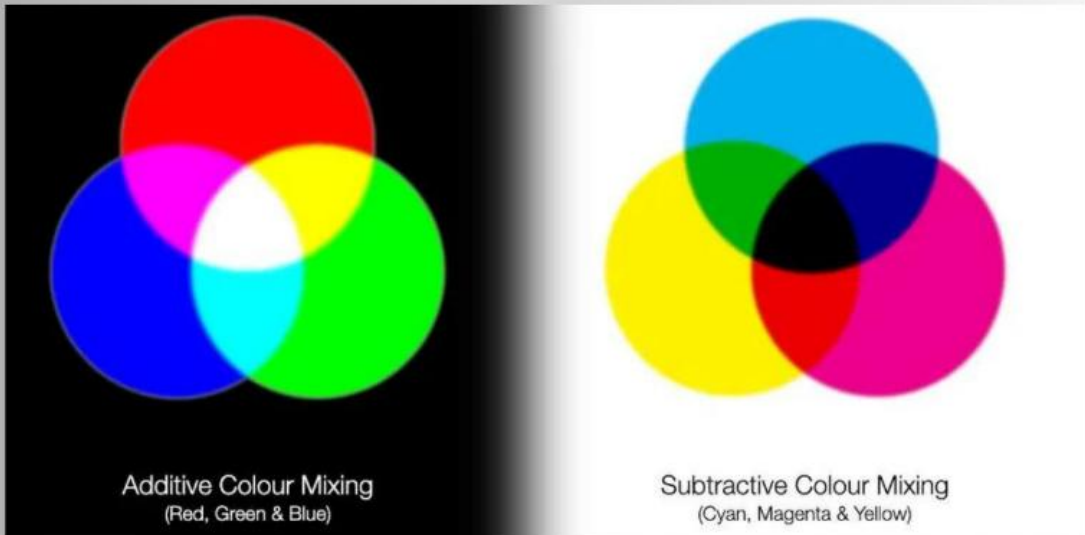
History

A quark is an elementary particle which combine to form composite particles like protons and neutrons. But the interpretation of quarks as actual physical entities was initially posed by two major problems. First, quarks had to have half-integer spin (intrinsic angular momentum) values for the model to work, but at the same time they seemed to violate the Pauli exclusion principle. In many of the baryon configurations constructed of quarks, sometimes two or even three identical quarks had to be set in the same quantum state—an arrangement prohibited by the exclusion principle. Second, quarks appeared to defy being freed from the particles they made up. Quarks are never found in isolation; they can be found only within hadrons.

A new quantum number

So, providing some understanding of the problem of binding and eliminating an apparent violation of the exclusion principle, a new quantum number was assigned to quarks: the **colour** charge. *The colour quantum number is to the true strong interaction as the electric charge is to the electromagnetic interaction.* Just as the electromagnetic interaction is the exchange of photons emitted and absorbed by electric charge, so the **real strong interaction** is the exchange of **gluons** emitted and absorbed by colour "charge". This colour interaction is to be distinguished from the interaction between hadrons, sometimes referred to as the nuclear interaction. The latter has been called the strong interaction, *but the true strong interaction is that due to colour.*

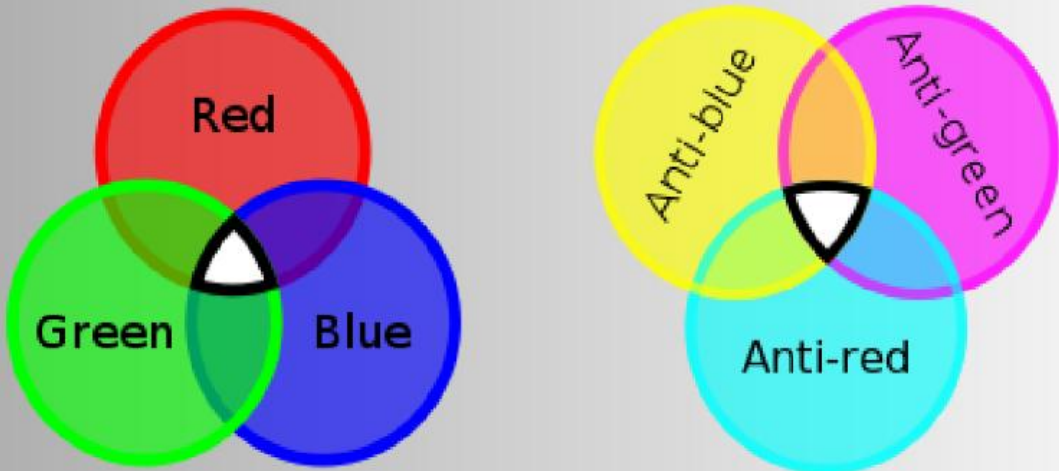
The terminology 'colour' is not literal as we usually think of it. The three possibilities for the quantum number 'colour' will here be designated as the subtractive primary colours **red**, **yellow**, and **blue**, since these three mixes as pigments to give colourless **black**. Often **red**, **green**, and **blue** are used, since these additive primary colours when mixed as light give colourless **white**. According to QCD (quantum chromodynamics), all combinations of quarks must contain mixtures of these colours that cancel out one another, with the resulting particle having no net colour. This allows only two combinations; quark-antiquark and three quarks which can achieve complete annihilation of colour, and hence only these combinations produce bound states. Quarks change their colour as they emit and absorb gluons, and the exchange of gluons maintains proper quark colour distribution. Gluons have a combination of two-colour charges (one of red, green, or blue and one of **antired**, **antigreen**, or **antiblue**) in a superposition of states which are given by the Gell-Mann matrices.

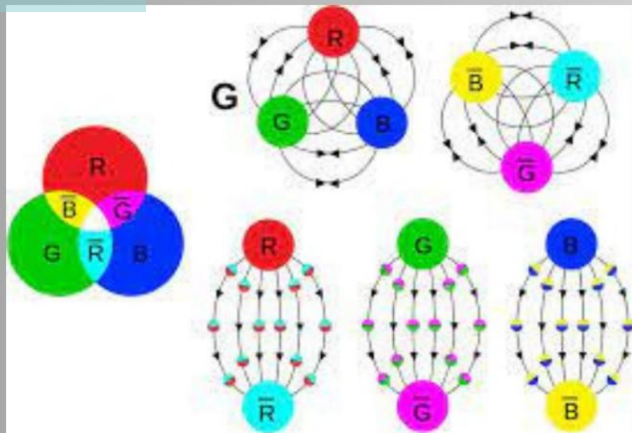


2.

Understanding the colour charge carriers: gluons

On a colour wheel with red, green and blue at three equidistant locations, like an equilateral triangle, the areas between red and green would be yellow; between green and blue would be cyan; between red and blue would be magenta. These in-between colour charges correspond to the colours of the antiparticles: the anticolors. Cyan is the same as anti-red; magenta is the same as anti-green; yellow is the same as anti-blue. Just as you could add up three quarks with red, green and blue colours to make a colourless combination (like a proton), you could add up three antiquarks with cyan, magenta and yellow colours to make a colourless combination (like an antiproton). As the way strong forces work is by exchanging gluons, so if a blue quark emits a gluon and turns red that indicates the colour charge on the emitted gluon is blue and cyan(anti-red), enabling colour conservation.





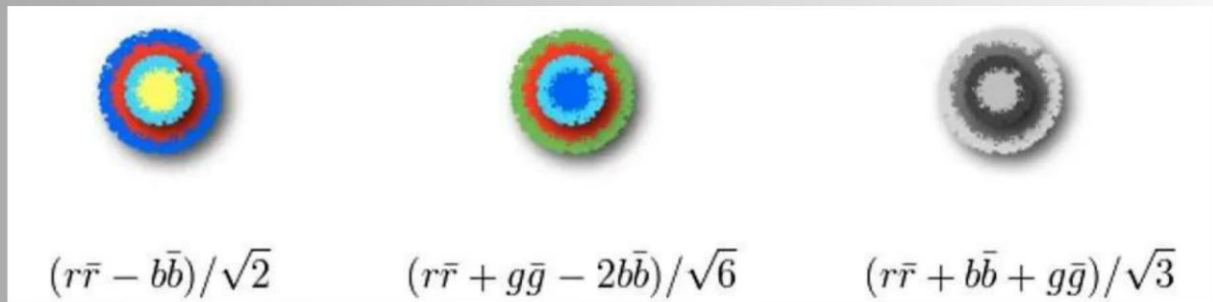
3.

Quarks													
u	u	u	c	c	c	t	t	t					
d	d	d	s	s	s	b	b	b					
Leptons													
e ⁻	ν _e	μ ⁻	ν _μ	τ ⁻	ν _τ								
Anti-Quarks													
\bar{u}	\bar{u}	\bar{u}	\bar{c}	\bar{c}	\bar{c}	\bar{t}	\bar{t}	\bar{t}					
\bar{d}	\bar{d}	\bar{d}	\bar{s}	\bar{s}	\bar{s}	\bar{b}	\bar{b}	\bar{b}					
Anti-Leptons													
\bar{e}^+	$\bar{\nu}_e$	$\bar{\mu}^+$	$\bar{\nu}_\mu$	$\bar{\tau}^+$	$\bar{\nu}_\tau$								
Bosons													
g	g	g	g	g	g	g	g	g	Y	W ⁻	W ⁺	Z ⁰	H

4.

Why are there only 8 gluons?


From all this information one might think then with three colours and three anticolours there would be 9 possible types of gluon. But there are only 8 gluons that exist. Imagine a red quark emitting a red/magenta gluon and turns green. This gluon if meets with a green quark that annihilates its magenta, then it turns red. So six such combinations are obvious: red/magenta, red/yellow, green/cyan, green/yellow, blue/cyan, blue/magenta. The remaining three combinations red/cyan, green/magenta and blue/yellow are colourless, and their mixtures form orthogonal eigen functions. Two asymmetric combinations among three still have some colour are: $(r\bar{r} - b\bar{b})/\sqrt{2}$ and $(r\bar{r} + y\bar{y} - 2b\bar{b})/\sqrt{3}$ still have colour. The last symmetric combination $(r\bar{r} + b\bar{b} + g\bar{g})/\sqrt{3}$ is a singlet, i.e., it is colourless and cannot physically interact. Therefore, there are only 8 physical gluons.



5.

While we ascribe colours to quarks, anticolours to antiquarks, and color-anticolor combinations to gluons, it's only a limited analogy. In truth, none of the particles or antiparticles have a colour at all, but merely obey the rules of an interaction that has three fundamental types of charge, and *only combinations that have no net charge under this system are allowed to exist in nature.*

Content source: [Quantum physics by Robert Eisberg and Robert Resnick section 18-5,18-7, Wikipedia.](#)
 Image references: (1)Wikipedia, (2)Athabasca University/Wikimedia Commons, (3) Maschen/Wikimedia Commons, (4)*Beyond the galaxy*-Ethan Seigal, (5) E. Siegal blogpost.



*Activities and Event
Section*

DBT STAR COLLEGE SCHEME sponsored 3-day workshop on telescope making and stargazing (TMS - 2023)

February 15-17, 2023

Durgapur Government College cordially invites you for the

DBT STAR SCHEME SPONSORED

A 3-day Workshop

ON

Telescope Making and Stargazing

February 15-17, 2023

Jointly organized by
The Department of Physics & Department of Mathematics, Durgapur Government College

Chief Patron
Dr. Debnath Palit

IQAC Coordinator
Dr. Avijit Mandal

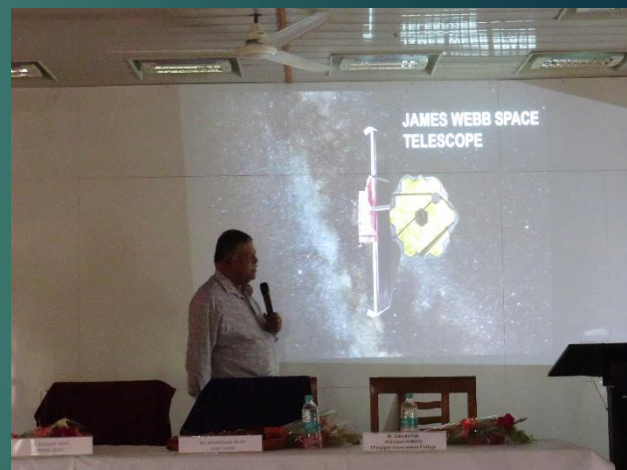
Joint organizing Secretaries
Prof. Sudeep K. Das
Dr. Pratikshan Mondal

Convener
Dr. Swapan Kumar Ghosh

Organizing Committee
Prof. Anilava Samanta
Dr. Ansur Rahaman
Dr. Somnath Bhattacharya
Dr. Hrishikesh Mondal
Prof. Sibaji Rit
Prof. Soumendu Nandy
Dr. Nupur Bhakta
Dr. Amiya Biswas

Key-Note Speaker
Dr. Debiprosad Duari
Director, Institute of Astronomy Space and Earth Science, Kolkata

Background Image: Courtesy IMAA



DBT STAR COLLEGE SCHEME sponsored One-day National Conference on Material Science, Nanomaterials and its applications in Biological Science (MSNBS-2023) On March 01, 2023



Durgapur Government College cordially invites you for the

**DBT STAR SCHEME SPONSORED
One-day National Conference on
Material Science, Nanomaterials and its applications in
Biological Science (MSNBS-2023)**

March 01, 2023

Organized by
Department of Physics
Durgapur Government College
J.N. Avenue, Durgapur - 713214
West Bengal, India

Invited Speakers



Dr. Pabitra Kumar Chakrabarti
Professor
Department of Physics
The University of Burdwan,
Burdwan




Dr. K. Sethuraman
Associate Professor
Department of Material Science
Central University of Tamilnadu





Dr. Santanu Kumar Mati
Associate Professor
Department of Physics
ISI, Kolkata

National Conference
on
**Material Science, Nanomaterials and its applications in Biological
Sciences (MSNBS-2023)**
March 01, 2023
Department of Physics, Durgapur Government College - 713214

*This is to certify that Sri/Smt./Dr. Samiran Mandal
of Government General Degree College at Pelong has presented a paper entitled,
Structural and optical correlation study of chemically synthesised CdS nanoparticles in
the National Conference on Material Science, Nanomaterials and its applications in Biological Sciences
(MSNBS-2023) organised by Department of Physics, Durgapur Government College, Durgapur.*


Dr. Debash Pali
Principal
Durgapur Govt. College


Dr. Somnath Bhattacharya
Joint Convener
Organizing Committee, MSNBS-2023


Dr. Nepra Bhakta
Joint Convener
Organizing Committee, MSNBS-2023

Sample Certificate

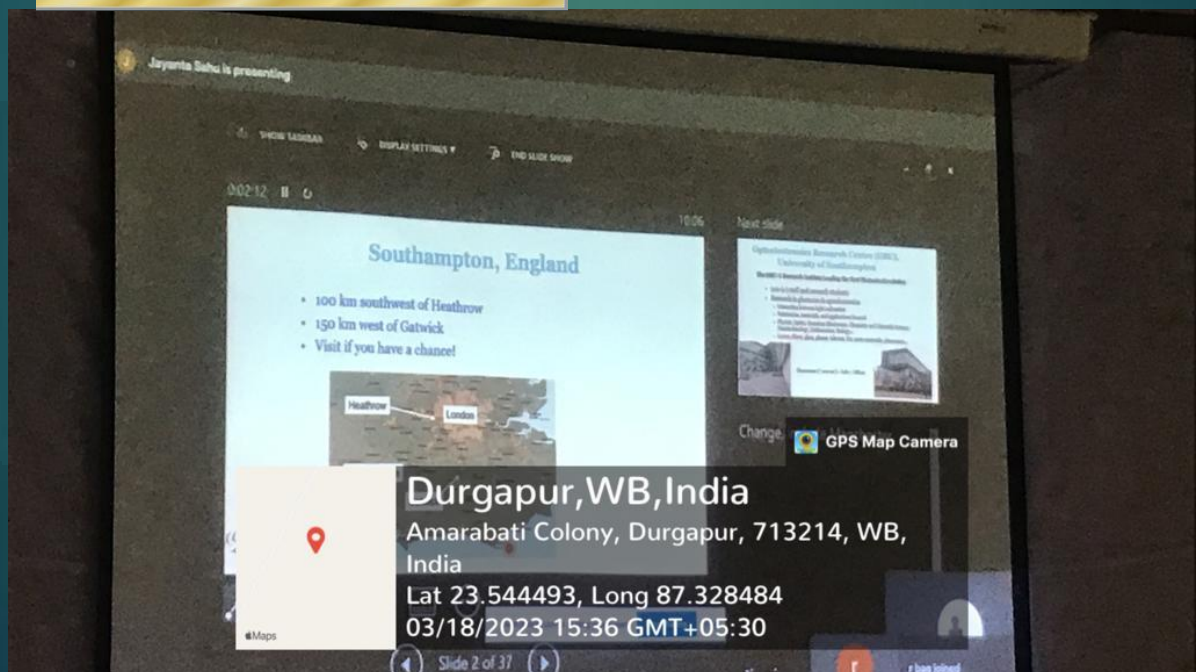


DBT STAR COLLEGE SCHEME sponsored International Conference on Nonlinear Dynamics and its Applications in Physical and Biological Sciences (NDAPBS-23)

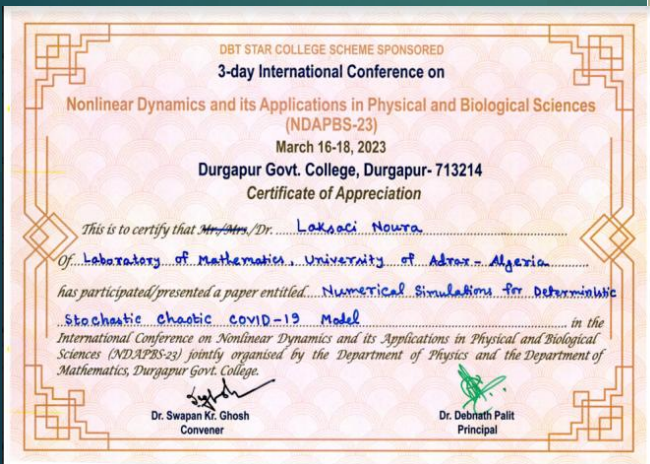
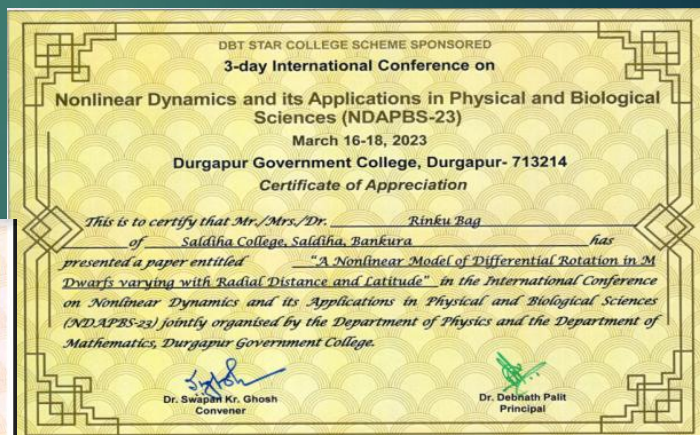
March 16-18, 2023




Announcement
International Conference
On
Nonlinear Dynamics and its Applications in
Physical and Biological Sciences
(NDAPBS-23)
March 16-18, 2023
Sponsored by
DBT STAR COLLEGE SCHEME
Jointly Organized by
The Department of Physics & Department of
Mathematics
Durgapur Govt. College
J. N. Avenue, Durgapur, Pin- 713214, WB, INDIA
(DST-FIST Sponsored & NAAC Accredited College with A Grade
in 2017 (2nd Cycle) with UGC 12 (B) and 2 (f) status)



DBT STAR COLLEGE SCHEME sponsored International Conference on Nonlinear Dynamics and its Applications in Physical and Biological Sciences (NDAPBS-23)



Sample Certificates

DBT STAR COLLEGE SCHEME sponsored Workshop on Electrical House Wiring and Electrical Safety on 31st March, 2023



DBT STAR COLLEGE SCHEME SPONSORED



Workshop on
Electrical House Wiring and Electrical
Safety (EHWES-2023)

March 31, 2023

Organized by
Department of Physics
Durgapur Government College,
Durgapur - 713214

Patron
Dr. Debnath Palit
Principal, Durgapur Govt. College
Convener
Dr. Somnath Bhattacharya
Organising Secretary
Dr. Hrishikesh Mondal

Local Organizing Committee
Dr. Anisur Rahaman
Dr. Swapan Kumar Ghosh
Prof. Sudeep Kumar Das
Dr. Nupur Bhakta



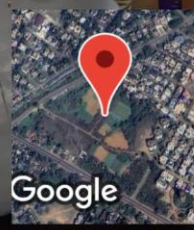
GPS Map Camera



Durgapur, West Bengal, India
G8RG+VX9, Amarabati Colony,
Durgapur, West Bengal 713210, India
Lat 23.542196°
Long 87.327447°
31/03/23 03:38 PM GMT +05:30



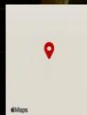
GPS Map Camera



Durgapur, West Bengal, India
G8QJ+QFG, Vaishali Cooperative Housing
Colony, Durgapur, West Bengal 713206, India
Lat 23.540228°
Long 87.331892°
31/03/23 04:24 PM GMT +05:30



GPS Map Camera



Durgapur, WB, India
Amarabati Colony, Durgapur, 713214, WB,
India
Lat 23.544519, Long 87.328522
03/31/2023 11:39 GMT+05:30

One Day Training Programme on “Laboratory maintenance and Safety management” on 24.06.2023



DBT STAR COLLEGE SCHEME SPONSORED



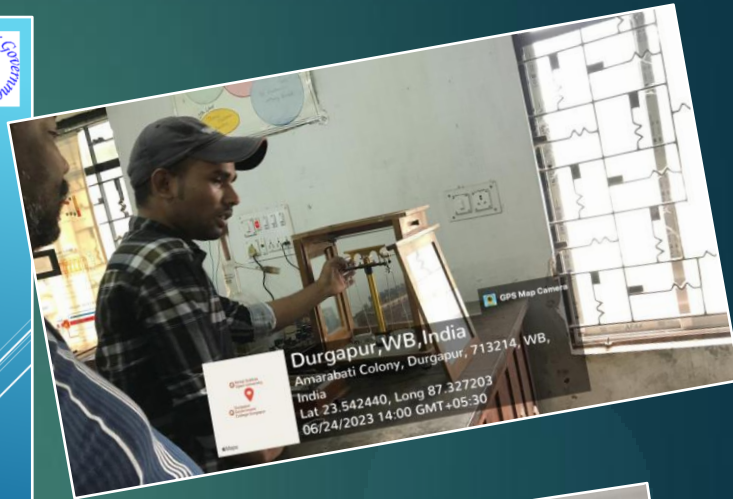
One Day Training Programme
on

Laboratory maintenance and Safety
management

June 24, 2023

Organized by
Department of Physics
Durgapur Government College,
Durgapur - 713214

This training program aims to give training on the maintenance of Laboratory and safety to the laboratory staff of the Department of Physics.



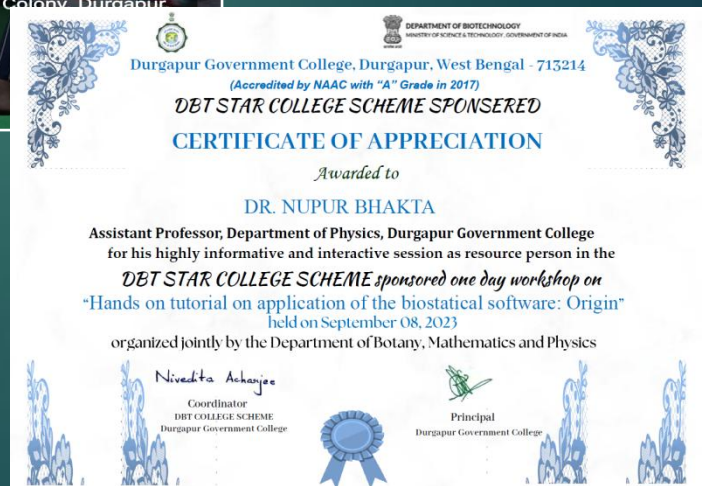
DBT STAR COLLEGE SCHEME sponsored 1. "Rural and Industrial Visit" at Shantiniketan (Jointly with Chemistry and Mathematics) on 25.08.2023



DBT STAR COLLEGE SCHEME sponsored Online Seminar on "Introduction to Biostatistics, with emphasis on Machine Learning" on 08.09.2023



Sample certificate



DBT STAR COLLEGE SCHEME sponsored Visit to the Research Laboratory of Central Mechanical Engineering Research Institute (CMERI), focused on the practical training of students on the "Aluminum composite and their structural evaluation through instrumentation" on 08-09-2023 (Jointly with Chemistry)

**OFFICE OF THE PRINCIPAL
DURGAPUR GOVERNMENT COLLEGE**

J.N. Avenue, Durgapur, Paschim Bardhaman 713214

No. 193

Date: 31-08-2023

NOTIFICATION

This is for information to all concerned that Department of Chemistry and Physics will conduct a Student Visit Program to the Research Laboratory of Central Mechanical Engineering Research Institute (CMERI), on 08-09-2023 (Friday) under the DBT STAR COLLEGE SCHEME focused on the practical training of students on the "Aluminum composite and their structural evaluation through instrumentation" so that students will get an exposure to the aforementioned developed technology. All interested students of Departments of Physics and Chemistry are hereby notified to fill the registration link given below for the aforementioned Student Visit program.

<https://forms.gle/z8nhEKHrfrwJcGDa6>

Nivedita Acharyee

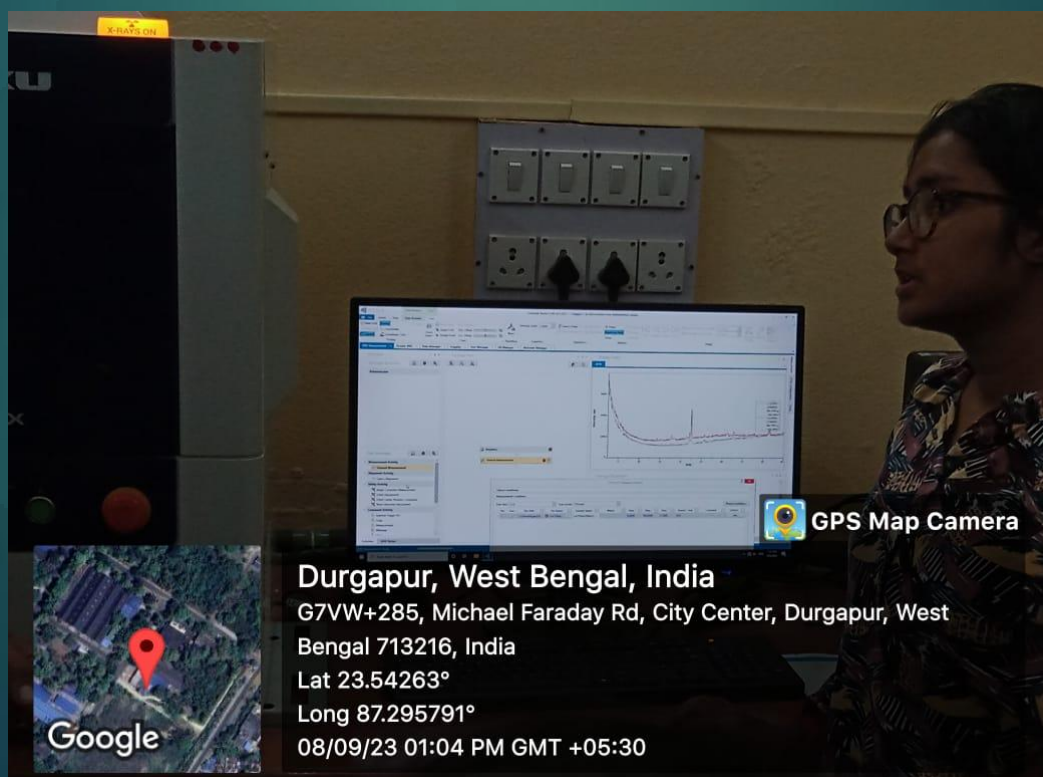
Dr. Nivedita Acharyee
Coordinator, DBT STAR COLLEGE SCHEME
Durgapur Government College



Principal
Durgapur Government College

Copy forwarded for information and necessary action to

1. Departmental Coordinators of all participating departments of DBT STAR COLLEGE SCHEME
2. All participating departments of DBT STAR COLLEGE SCHEME
3. Notice Book, Office of the Principal



Outreach program on "Common Scientific Facts behind the Common Superstitious Beliefs" on 23.09.2023

OFFICE OF THE PRINCIPAL
DURGAPUR GOVERNMENT COLLEGE
J.N. Avenue, Durgapur, Paschim Bardhaman 713214

No. 218

Date: 21-09-2023

NOTIFICATION

This is for information to all concerned that an outreach program on "Common Scientific Facts behind the Common Superstitious Beliefs", will be organized by the faculty members of Departments of Botany, Mathematics and Physics and the Coordinator, DBT STAR COLLEGE SCHEME, Durgapur Government College, on 23-09-2023 in collaboration with "Breakthrough Science Society" under the DBT STAR COLLEGE SCHEME of the institution for the students of Bidhannagar Government Sponsored Boys' High School, Durgapur.

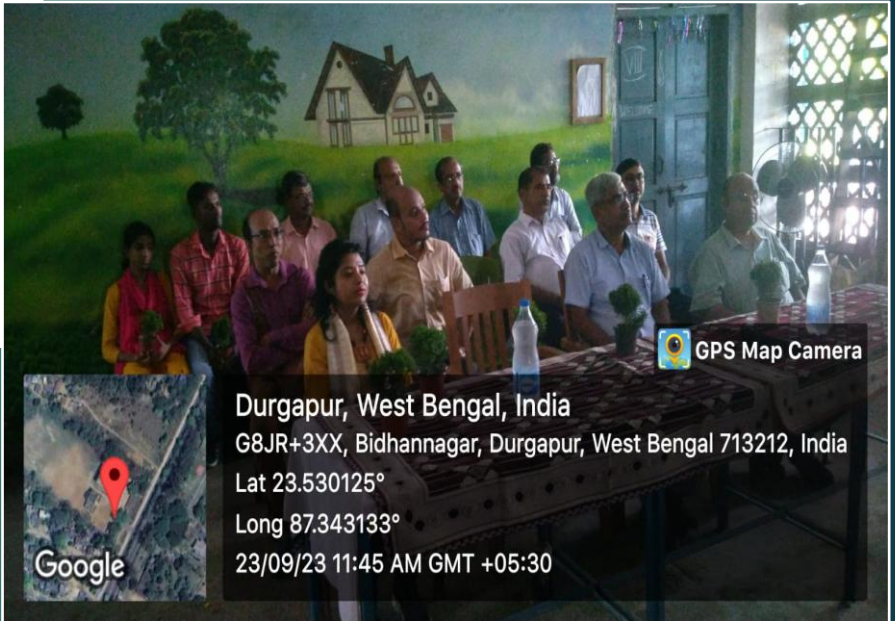
Nivedita Acharjee

Dr. Nivedita Acharjee
Coordinator, DBT STAR COLLEGE SCHEME
Durgapur Government College



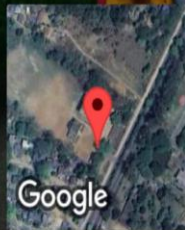
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2. All participating departments of DBT STAR COLLEGE SCHEME
3. Notice Book, Office of the Principal



GPS Map Camera

Durgapur, West Bengal, India
G8JR+3XX, Bidhannagar, Durgapur, West Bengal 713212, India
Lat 23.530125°
Long 87.343133°
23/09/23 11:45 AM GMT +05:30



Hands-on Training on "Digital Image Processing: An Overview" jointly with Geology and Mathematics on 26.09.2023

OFFICE OF THE PRINCIPAL
DURGAPUR GOVERNMENT COLLEGE
J.N. Avenue, Durgapur, Paschim Bardhaman 713214

No. 230

Date: 23-09-2023

NOTIFICATION

This is for information to all concerned that a Hands-on Training on "Digital Image Processing: An Overview" for B.Sc. students will be conducted by the Departments of Mathematics, Geology and Physics on 26-09-2023 from 2 pm onwards under the DBT STAR COLLEGE SCHEME of Durgapur Government College.

Departmental Coordinators of the DBT STAR COLLEGE SCHEME are requested to accordingly inform the respective students for participation in the aforementioned Hands on Training Program.

Nivedita Acharyee

Dr. Nivedita Acharyee
Coordinator, DBT STAR COLLEGE SCHEME
Durgapur Government College



Principal
Durgapur Government College

Copy forwarded for information and necessary action to

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2. All participating departments of DBT STAR COLLEGE SCHEME
3. Notice Book, Office of the Principal



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Lat 23.54222°
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Durgapur, West Bengal, India
G8RG+WXX, Jawahar Lal Nehru Road, Amarabati Colony, Durgapur, West Bengal
713214, India
Lat 23.542505°
Long 87.326773°
26/09/23 02:22 PM GMT +05:30

Students practicing their teaching ability



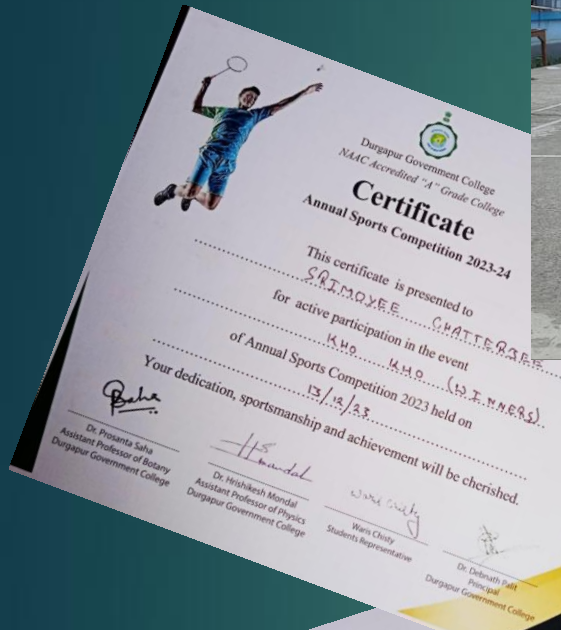
A yellow ribbon graphic with a dark red outline, featuring a central rectangular section and two pointed ends. The ribbon is positioned horizontally across the middle of the page.

*Our
Achievement*

Utkarsha Samman for the years 2019 (PG only), 2020 (UG and PG), 2021 (UG and PG) and 2022 (UG and PG) on 22nd February, 2023.



Participation in Annual Sports of our College



Srimoyee Chatterjee
B.Sc. (Physics Honours) 1st Semester



Poster Section

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INTRODUCTION

Bioelectromagnetism is an interdisciplinary subject that deals with the study of electromagnetism and its impact on living organisms. Our body is strongly dependent on the electric and magnetic field inside and outside our body. The first experiment on bioelectricity was done in 1780 by Italian Physiologist Luigi Galvani, by showing the excitation of a frog's muscle cell in presence of electric field. Later on, bioelectromagnetism started evolving into one of the most interesting and vital subjects in physiology and medical physics.

BIOELECTRIC EXCITATION OF NERVE AND MUSCLE CELLS

The nerve cells and the muscle cell's membranes are electrically excitable. The cell membranes consists of small pores called ion channels, through which sodium, potassium and chloride ions passes. The motion of these ions forms the basis of bioelectricity in these cells. The transmembrane voltage (V_m) of an excitable cell is defined as the potential at the inner surface (Φ_i) relative to that at the outer surface (Φ_o) of the membrane. For voltage greater than the Threshold potential, the nerve cells will only produce an impulse. (See Fig. 1)

The transmembrane voltage can be classified as follows:

- 1) Resting Potential
- 2) Changing Potential —
 - a) Pacemaker Potential
 - b) Transducer Potential —
 - I) Generator and Receptor
 - II) Synaptic

In the myocyte cells in heart, electric activation takes place by the inflow of sodium ions and outflow of the potassium ions. The average time for this cell activation is 300ms, and the activation potential for both nerve and muscle cells are about 100mV. The graph below (Fig. 2) illustrates the electrical activity and mechanical contraction in a frog's heart muscle.

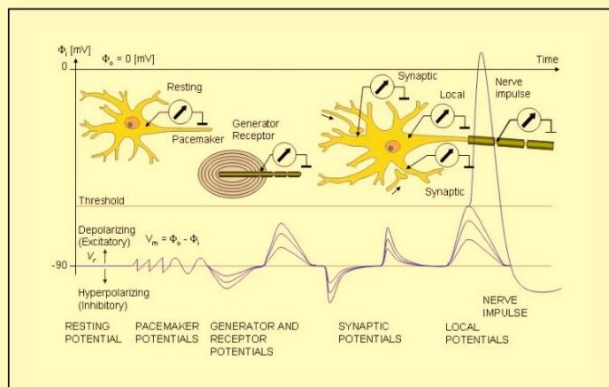


Fig. 1

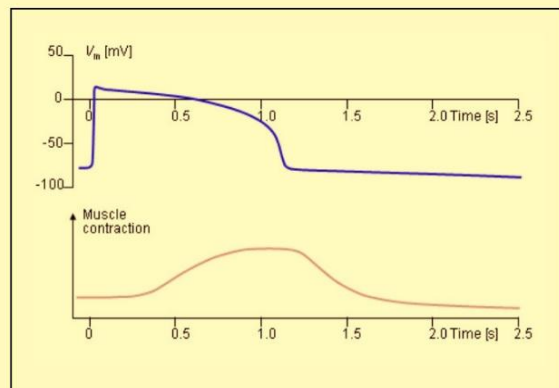


Fig. 2

MEASUREMENT OF ELECTRIC AND MAGNETIC FIELD GENERATED BY HEART AND BRAIN.

The heart and the brain of a living organism can also be considered as a source of electric and magnetic field, and the magnitude of those fields can be measured and used to treat medically using these processes:

1) ELECTROENCEPHALOGRAPH (EEG):

EEG is the process of measuring spontaneous activity in the brain of a living individual. It is mainly used to detect and investigate epilepsy in a person. The output signals of EEG depends on the consciousness of a person (Fig. 3), and its signal bandwidth ranges from 1-50 Hz and its amplitude ranges from $100\mu\text{V}$ to 2mV .

2) MAGNETOENCEPHALOGRAPH (MEG):

MEG is the process of measuring the magnetic field generated from the brain. Unlike EEG signals, these signals are a bit less powerful, having an amplitude of 100fT (femto Tesla). These signals can be detected using special Super-conductor Quantum Interference Device (SQUID), coupled with magnetometer, and is kept in a magnetically shielded room. An advantage of MEG signal over EEG is that it passes through the head without any distortion. It is used to produce high resolution images of the brain and to diagnose diseases in brain.

CONCLUSION

Bioelectromagnetism is a very vital subject in medical science. Without this subject, biophysics and medical physics is almost incomplete. The advent of this subject since it was first discovered proves the vitality of this field, and it is a fact that there is still more to be found about this in the near future.

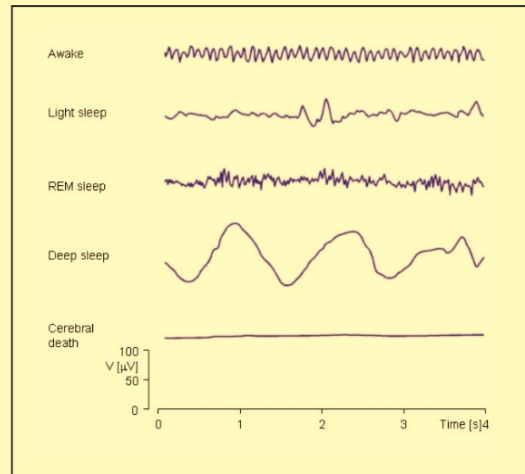
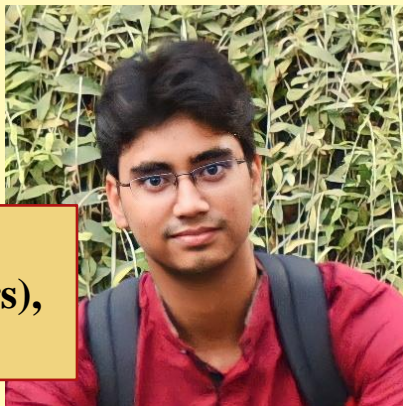


Fig. 3

3) ELECTROCARDIOGRAM (ECG):

ECG is the process for making Electrocardiographs, graphs that shows the activity of an individual's heart. It uses sensors that sense the electric field generated each time the heart beats. The electricity generated while contraction and relaxation of the myocytes produces this electric field.



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Note: Images and Graphs in this poster are taken as a reference from the book "Principles and Applications of Bioelectric and Biomagnetic Fields" by Jaakko Malmivuo and Robert Plonsey for a better understanding on the matter.



CONTROVERSY ON LIGHT



Pritam

Sir, what is light actually?



Huygen

light is a longitudinal wave in the aether medium - a medium that pervades the entire universe.



Isaac Newton

No you are wrong Huygen. Light consists of large number of particles, propagation of light is caused by the rectilinear motion of light particles which he termed light corpuscles.



No I'm correct, Light behaves as a wave - it undergoes reflection, refraction, and diffraction just like any wave would.



No, I'm correct Because waves do not move in straight lines, the geometric character of light reflection and refraction could only be explained if light were composed of particles called corpuscles.

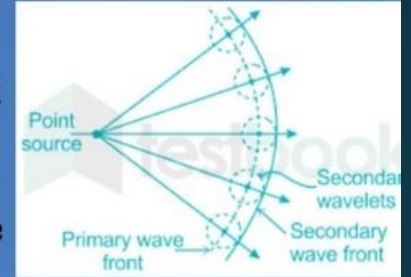
Pritam Mondal
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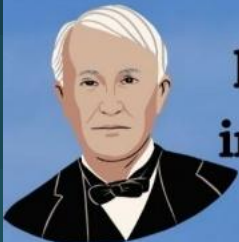
CONTROVERSY ON LIGHT



Every point on a wavefront is in itself the source of spherical wavelets which spread out in the forward direction at the speed of light. The sum of these spherical wavelets forms the wavefront.

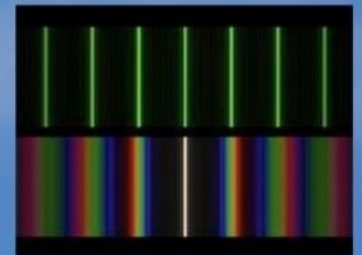


You know an interesting fact if we project light through a prism it will split into seven colors.



Thomas Young

light shows the phenomena of interference it is now clear that light is a wave .

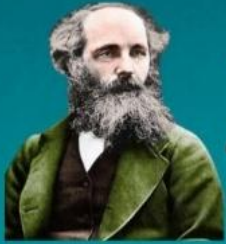


Étienne-
Louis Malus

you are right Young, light is a wave , but according to Huygen light is longitudinal wave which is not correct. I discovered the Phenomena of Polarisation which prove that light is a transverse wave .

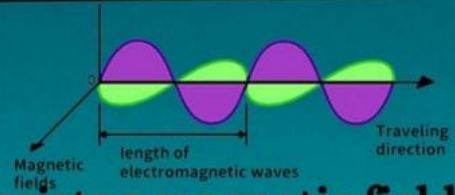


CONTROVERSY ON LIGHT



Maxwell

Yes, light is a wave it consists a magnetic field and electric field which are perpendicular to each other and also perpendicular to the direction of propagation of light

Heinrich
Rudolf
Hertz

I discovered a new phenomena 'Photo-Electric' effect. Can you explain the phenomena by considering light is a wave? The most interesting thing is that this effect doesn't depend on intensity whatever the intensity if the frequency is less then there is no emission of photo electrons. So it's energy doesn't depend on the intensity so may be light is not a wave



Albert Einstein

light possess dual nature. It consists large numbers of Photons having energy hf (where h is the plank constant and f is the frequency) and it's energy depends on the frequency.

CONCLUSION : Light possess dual nature

Wave nature as well as particle nature. Polarisation, Interference, Diffraction these experiments are the evidences that light is a wave and on the other hand Compton effect, Photo electric effect can be explain by considering light is made up of large number of particle called 'Photon'.

The Secret of Darkness



How many stars are there in our Universe?



Using the Milky Way as our model, we can multiply the number of stars in a typical galaxy (100 billion) by the number of galaxies in the universe (2 trillion). The answer is an absolutely astounding number. There are approximately 200 billion trillion stars in the universe.



Ohh 🤔. So why is it dark at night if only 0.0000....01% light can come from these stars then it will be bright.



The darkness of the night sky is one of the pieces of evidence for a dynamic universe, such as the Big Bang model. That model explains the observed non-uniformity of brightness by invoking expansion of the universe, which increases the wavelength of visible light originating from the Big Bang to microwave scale via a process known as redshift. The resulting microwave radiation background has wavelengths much longer (millimeters instead of nanometers), which appears dark to the naked eye and bright for a radio receiver.

"The universe is made of stories, not of atoms, atoms"

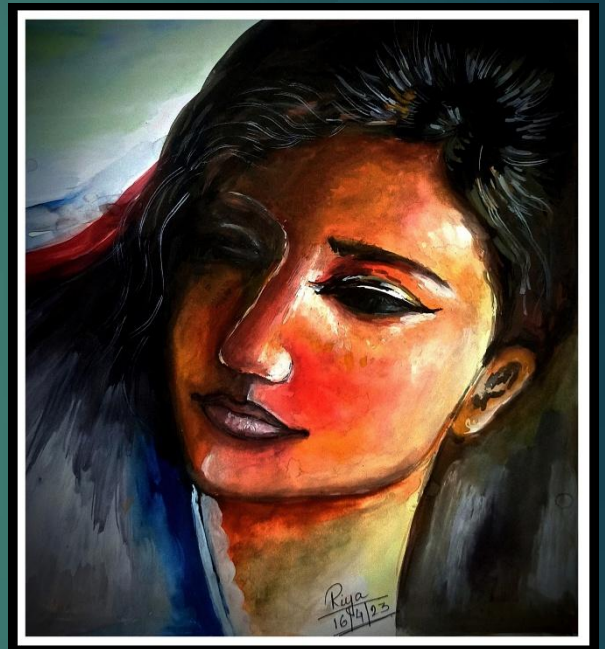
~ Muriel Rukeyser

Pritam Mondal
B.Sc. (Physics Hons.),
passed out (2020-2023 batch)



A yellow ribbon graphic with a dark red outline, featuring a central rectangular section and two pointed ends. The ribbon is positioned horizontally across the middle of the page.

Artist Section



**Art by Riya Biswas
B.Sc. (Physics Honours),
Passed out (2020-2023 Batch)**



Art by Riya Biswas
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Cultural activity of our student on
6TH REGIONAL SCIENCE & TECHNOLOGY
CONGRESS (REGION-3), 2023-24
Comprising Districts of Birbhum, Hooghly, Paschim
Bardhaman and Purba Bardhaman

Jointly organized by
Durgapur Government College
and
Department of Science & Technology and Biotechnology
(DSTBT), Government of West Bengal



Puspita Mukherjee
B.Sc. (Physics Honours) 1st Semester